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Isolation and Screening of Multi Drug Resistant Bacteria from Expired Tablet Dumped Garbage

S. Anbuselvi*, K. Priyanga and Albenna Reji

[1]Department of Industrial Biotechnology,Bharath University, Chennai-73, India

Abstract : Microbes play an significant role in soil structure and fertility. It enhances in decomposition of organic matters, beneficial role in returning nutrients to their mineral forms, which plants can take up again. Agriculture depends heavily on ability of certain microbes for the growth and production. These kinds of bacteria's and other useful micro-organisms are killed by dumping of expired toxic tablets in the soil. These continuous dumping of expired tablets in soil will affect the plant growth and killing of soil microbes in an ecosystem. These will also contaminate the ground water. So safe disposal of pharma waste is very important otherwise it will create a major problem in future.
Key Words : Microbes, soil, tablets,dumping.

Introduction

Soil microbes bacteria, archaea, and fungi are involved in cycling of all major elements (e.g. C, N, P) which is an important factors for plant growth.Well nourished soils are essential for the integrity of terrestrial ecosystems to remain intact or to recover from disturbances, such as drought, climate change, pest infestation, pollution, and human exploitation including agriculture[1].

Pharmaceuticals are often used as part of humanitarian assistance. The unsafe disposal of these unwanted or expired drugs often creates a major problem and dumping it in the soil makes the soil unfit for anything. Microorganisms are further associated with the transformation of toxic compounds in soil and degradation of waste materials and synthetic organic compounds [2].Now a days , the protection of soil is therefore of high priority to maintain an ecosystem processes . Most bacteria are able to tolerate tiny change in an environmentalfactors and can adapt over the time scale of minutes, hours, or days

Pseudomonas species tend to be more predominant amongt he bacteria associated with plant's rhizosphere[3]. *Pseudomonas aeruginosa* is currently considered one of the most frequent causative agents of hospital-associated infections and therefore has been the subject of many epidemiological investigations[4,5] . It is a gram negative bacteria which causes inflammation, sepsis, lung infections, urinary tract infection[6]. It lives on moist surfaces of hospital related areas [7].*Pseudomonas aeruginosa* is a common microbe inhabitant of sewage and large population persists even after anaerobic treatment of sewage [8]. *Pseudomonas aeruginosa* also involved in the degradation of polyurthene in soil [9].In some species of *Pseudomonas,*were able to degrade hydrocarbonsand the production of surfactants and it act as multidrug resistance against many bacterial pathogens[10,11]The main objective of this study was to isolate microbes from soil of dumped expired tablets and its adverse effect on the growth of plants. *Pseudomonas,*

Materials and Methods

Soil sample was collected near dumped garbage of expired tablets .The soil sample was diluted by serial dilution method, followed by spread plate method using nutrient agar medium. The morphological characteristics of microbes were identified by gram's staining and motility test. The isolated organism was further confirmed by keeping in Mac conkeyagar, Cetrimide agar and Simmons citrate medium. The various biochemical tests of triple sugar iron agar, oxidase, catalase ,indole and VP tests for screening of microbes specifically..

Results and Discussion

The isolation and screening of microbes in control soil and soil of dumped expired tablets were analyzed. The soil samples were diluted by serial dilution.In spread plate , many microorganisms are present in control soil whereas only one organism was more predominantly grown in sample soil. This shows the toxicity tolerance of microbe in sample soil. The isolated microbes showed gram negative bacteria with rod shaped morphology. .It was sub cultured again in MacConkey agar plate and conformed as *Pseudomonas* p by using cetrimideagar. This gram negative bacteria is subjected to biochemical test to identity the species.(Table 1)

Table1: Biochemical test for *pseudomonas aeruginosa*

S.No	Tests	Results
1	Motility	Motile
2	Simmons citrate	Positive (green to blue)
3	Triple sugar iron agar	Negative
4	Indole	Negative
5	VP test	Negative
6	Urease	Negative
7	Catalase	Positive
8	Glucose fermentation	Negative
9	Gelatin hydrolysis	Positive
10.	Nitrate reductase activity	Positive
11	Oxidase	Positive
12	Pigmentation	Positive

It was a gram negative motile bacterium. It was cultured in Simmons citrate medium for further clarification, organisms degrading citrate must also use the ammonium salts, producing ammonia thus increase the pH then cause the color change. Triple sugar iron agar test result was negative.Thisshowed the bacteriadoesnot ferment sugars. Since it was gram negative, rod shaped, motile, citrate and non-fermenting bacteria it doubted as *pseudomonas(*Fig1).

Infectious diseases have been the main cause of morbidity and motility throughout our life. The ability of bacterial pathogens can adapt and overcome the challenges of antibiotics in their environment. Some of drug resistant pathogens include *staphylococcus, streptococcus pneumoniae,Enterococcus sp,E.coli* and *pseudomonas aeruginosa.pseudomonas* exhibit the maximum rate of antibacterial resistance for the fluoroquinolones with resistance to ciprofloxacin and levofloxacin (20-35%)

Conclusion

Simply dumping the expired tablets or waste tablets in the soil may have unintended effects on animals and microorganisms in the environment. It also contaminates the ground water. *Pseudomonas aeruginosa*, multidrug resistance bacteria is only found in dumping expired tablets. There are many ways of safety disposals of pharmaceuticals such as return to the donor or manufacturer, encapsulation, sewer, burning in the open container, medium temperature incineration, novel high temperature incineration, chemical decomposition. These kinds of safety disposals will save the lives of microorganisms as well as the environment.

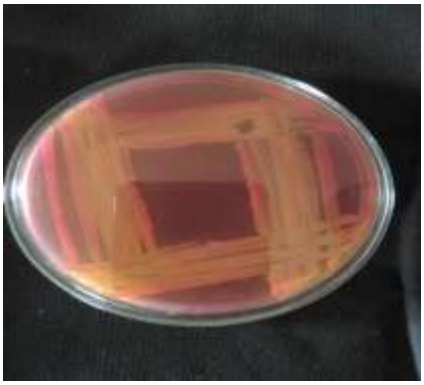

Figure1: Identification of *pseudomonas aeruginosa*

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